THE GREENPRINT

NEVADA'S ENVIRONMENTAL LITERACY PLAN

The goal of environmental education is to foster and support learning that positively transforms how we think, make decisions, and lead our lives. The future depends on our collective ability to apply an integrated approach to teaching and helping students understand the inter-dependent elements of sustainable environmental systems from ecological, economic, and community perspectives.

This integrated systems approach to education will contribute to the ongoing development of an environmentally literate population.

> *Environmental Literacy is the capacity to perceive, understand and interpret environmental systems and to take appropriate action to maintain, restore, or improve the health of those interconnected systems.*

1. SPECIFIC CONTENT STANDARDS, CONTENT AREAS, AND COURSES OR SUBJECTS WHERE INSTRUCTION WILL TAKE PLACE.

The specific content standards, content areas, and subjects where instruction will take place are embedded in the Nevada State Environmental Literacy Core Concepts (listed below). These Core Concepts provide a coherent articulation of the broad content and experience needs to develop an environmentally literate citizenry.

ENVIRONMENTAL LITERACY CORE CONCEPTS:

A. All Life on Earth exists within an ecosystem

B. Human beings are an integral part of all ecosystems.

C. Healthy ecosystems provide many essential services and benefits that sustain and improve human lives.

D. The human experience requires a connection to nature. These experiences in natural places in our community enrich our lives and inspire our choices for future generations.

E. Human beings are responsible for dramatic changes to ecosystems at a rate unprecedented in Earth's history.

F. We have a responsibility to care for the Earth, to leave healthy ecosystems for our families and future generations.

The Environmental Literacy Core Concepts are further described by benchmarks (see Appendix I). These benchmarks are directly and indirectly related to Nevada State Education Standards, including Science, Health, and Social Studies. Effective environmental education will therefore be integrated across all content areas through these Core Concepts. Both Formal and Non-formal education providers will support this interconnected model.

Mastery of these Environmental Literacy Core Concepts will take time. The GreenPrint therefore describes three levels of achievement that represent depth of understanding and action. These three stages of mastery are: Emergent, Functional, and Operational (described in Appendix II).

2. A DESCRIPTION OF HOW STATE HIGH SCHOOL GRADUATION REQUIREMENTS WILL ENSURE THAT GRADUATES ARE ENVIRONMENTALLY LITERATE.

There are four essential components of environmental literacy: knowledge, skills, affect, and behavior. Students will work toward environmental literacy through a variety of experiences, including classes, field trips, service learning, and other delivery methods.

Nevada's legislature passed a law in 2007 mandating that every high school student take three science credits. This provides a unique opportunity to provide 'capstone' classes for high school students that can both contribute to graduation requirements and to environmental literacy. The GreenPrint recommends that the State Education Board assign an "Environmental Science" synthesis class to fulfill one of these credits.

Individual school districts will be provided with learning objectives and standards (based on the Environmental Literacy Core Concepts) that will need to be met through the recommended Environmental Science Class. Each school district will have the freedom to design this interdisciplinary course to suit their needs, based on environmental literacy learning objectives and testing standards.

Student's depth of knowledge will be assessed through an existing 'end-of-course' assessment. Results from these end-of-course proficiency exams would be published in the Nevada Report Card and will serve as a metric for students' environmental literacy statewide.

Measurements relating to the other essential components of environmental literacy – affect, skills, and behavior – are described in Section 4.

The expectation is that students will be environmentally literate at the 'Functional' level by the time they graduate from high school (as described in Appendix II).

"Graduation Requirements" Next Steps	Responsibility	Date
State Board assigns one of the high school science classes as a "synthesis" Environmental Science class	Nevada State Board of Education	Summer 2010
End-of-course assessments developed	State Science Coordinator	Fall 2010
Design the "Synthesis" class to meet assessments	School districts	By Spring 2011

3. A DESCRIPTION OF PROGRAMS FOR PROFESSIONAL DEVELOPMENT OF TEACHERS TO IMPROVE THEIR ENVIRONMENTAL CONTENT KNOWLEDGE, SKILL IN TEACHING ABOUT ENVIRONMENTAL ISSUES, AND FIELD-BASED PEDAGOGICAL SKILLS.

Educators should be provided with an instruction model that helps them to establish their understanding of environmental literacy and affords them the structure with which to plan and implement instruction to foster environmental literacy.

Professional development opportunities will be provided through a variety of venues, including: formal classes; school-site trainings; evening and weekend workshops; symposiums; retreats; and conferences. Formal and non-formal education providers will work together to ensure quality professional development opportunities are created.

Nevada currently provides a variety of opportunities for educators to enhance their knowledge and skills in the fundamental characteristics and goals of environmental education. However, there is a need to expand these opportunities so that all six Environmental Literacy Core Concepts are addressed. Professional development opportunities should emphasize pedagogical approaches, content, and/or strategies; opportunities should also be convenient, affordable, and of high quality.

PROFESSIONAL DEVELOPMENT PROGRAMS

Pre-service Educators

The colleges and universities in Nevada will be encouraged to incorporate one or more of the following in their pre-service programs:

1. Units in science methods courses that teach the Nevada Environmental Literacy Core Concepts and their application for classroom education. Due to the interdisciplinary nature of the Core Concepts, complimentary units in other methods courses should also be considered.

2. A course in the elementary and secondary education course requirements that would include: the knowledge and skills necessary to incorporate environmental science in an interconnected, interdisciplinary model; the strategies necessary to use the outdoors as a classroom; and the strategies necessary to teach service learning components.

3. An environmental education minor or supplemental certification program or endorsement, with the appropriate number of credits earned by taking a variety of environmental studies and environmental education courses.

4. An environmental education major, with students completing a combination of environmental studies and environmental education courses, in addition to required core course work for education majors. The Standards of Best Practices for Nevada Environmental Education and Interpretation Professionals (from the Nevada State Certification Program for Environmental Education and Interpretation) should be used as a guide for this coursework.

5. Early childhood programs will be encouraged to incorporate age-appropriate environmental education strategies, including the strategies necessary to use the outdoors as a classroom.

In-Service Educators

1. PreK-8 certified educators will be encouraged to earn a minimum of 2 credits, either NDOE renewal credits or college credits, with an environmental education theme during their next recertification period.
2. School Districts will be encouraged to support professional development opportunities with an environmental education theme. Non-formal education institutions can help provide these opportunities.
3. Regional and district professional development trainers, non-profits, colleges and universities, and non-formal education institutions will be encouraged to provide and support opportunities for formal educators to gain knowledge and resources needed for

gaining skills in teaching environmental education, as well as strategies for teaching in the outdoors, experiential learning, and service learning opportunities for their students.

4. Elementary schools will be encouraged to schedule professional development opportunities with an environmental education theme.
5. Middle schools will be encouraged to offer professional development opportunities that provide strategies for incorporating environmental education into interdisciplinary, thematic units.
6. High schools will be encouraged to schedule professional development opportunities that provide secondary teachers the skills, knowledge and resources needed to incorporate the study of environmental issues in a variety of disciplines.
7. Job shadowing opportunities in areas such as sustainability, green jobs, conservation, ecology, environmental protection, and outdoor education, will be encouraged for teachers. This will serve to enhance their knowledge of career pathways as well as their own personal environmental literacy.

Non-Formal Educators

Non-formal educators will be encouraged to participate in workshops that will enhance their knowledge and understanding of the Nevada State Standards, instructional planning and delivery strategies for diverse audiences, and partnership opportunities with schools to advance environmental literacy in Nevada. This may include, but is not exclusive to the Environmental Education and Interpretation Certification program(s) offered in the State.

EDUCATOR PROFICIENCIES

After completion of pre-service coursework and/or in-service professional development options, Nevada educators will have improved their environmental literacy, skill in teaching about environmental issues, and field-based pedagogical skills.

In an effort to best meet the needs of Nevada's educators, the following proficiencies have been identified as key recommendations.

1. Understanding of the GreenPrint's Core Concepts, benchmarks and levels of achievement, and how they complement, enhance, and focus an interdisciplinary model for instruction.
2. Functional mastery of environmental literacy.

3. Awareness of local, state, and federal resources, agencies, and Non-formal education institutions and their contributions in Nevada as they relate to environmental literacy, and the ability to access these resources to enhance the educational experience for Nevada's students.
4. Knowledge of local ecology (flora, fauna, ecosystems, geology) and the opportunities within Nevada related to environmental literacy.
5. Action skills to address a variety of environmental issues important to Nevada.

INSTRUCTION MODEL

Achieving Foundational Mastery of the Environmental Literacy Core Concepts will require integration of the Concepts into a variety of disciplines. In order to successfully accomplish this goal, educators need a comprehensive dynamic instructional model. It is suggested that the Science, Technology and Society curricular model be augmented for this task. James, Robinson and Powell modified the model in 1994 to address the point that interconnected topics should not be examined in isolation. The proposed 6-Rings of Environmentally Active Learning (6-REAL) model utilizes a center concept or fundamental idea as a focus for study. After the focus for study is determined, the focus concept is studied through the lens of each of six sub-foci, providing different perspectives of the focus concept. The six sub-foci lenses are: economics, society, environment (physical setting), science, ethics, and technology.

The 6-REAL instructional model provides a framework for both teachers and students to learn about the interrelationships, and often inter-dependence, between many of the complex and dynamic issues involved in environmental education. Each of the benchmarks for the Environmental Literacy Core Concepts (Appendix I) can be the focus concept for the 6-REAL model.

Professional Development Next Steps	Responsibility	Date
Schedule meetings/contacts with colleges and universities to explore the current coursework options and how these may link with recommendations. Define next steps.	TBD (GreenPrint Committee members?)	Beginning May 2010
Schedule meeting/contacts with the Department of Education regarding recommendation for Recertification Credits with an Environmental Education Theme	State Science Coordinator	Beginning Jan. 2010

Schedule meetings/contacts with Early Childhood education programs (Dept. of Education and current providers) regarding incorporating Environmental Education programming. Define next steps.	State Science Coordinator	Beginning Jan. 2010
Schedule meetings/contacts with district superintendents and/or professional development representatives to market the plan and opportunities for educators.	Professional Development Committee Members	Beginning Feb. 2010

4. A DESCRIPTION OF HOW THE STATE EDUCATION AGENCY WILL MEASURE THE ENVIRONMENTAL LITERACY OF STUDENTS.

Students' environmental literacy will be measured based on (1) specific knowledge they've obtained and (2) on the affect/skills/behavior developed in conjunction with that knowledge. To truly measure a student's level of environmental literacy, it is therefore necessary to use a multi-layered measurement system that is integrated across experiences where possible.

This measurement system must take into account the variety of experiences that each student will have on their journey to environmental literacy, both through Formal and Non-formal education.

Non-formal education providers will partner with school districts to provide experiences to students in K-8. The location and type of experience will vary tremendously, from a single three-hour field trip to a museum, to a multi-day field study experience, to an entire course utilizing service-learning.

Non-formal educational providers should follow the Standards of Best Practices for Nevada Environmental Education and Interpretation Professionals. These Standards will promote a standardized quality of experiences designed to foster environmental literacy. Importantly, the Standards of Best Practices include the use of authentic assessments to both ensure experiences meet stated objectives and to determine whether participants gain the knowledge and skills needed to become environmentally literate.

The number of students who participate in Non-formal learning experiences will be reported through the Nevada Report Card.

KNOWLEDGE

The Environmental Literacy Core Concepts will be built into future revisions of the K-8 Nevada Educational Standards. It is recommended that the Environmental Literacy Core Concepts and Benchmarks that relate to science be incorporated as a new 'Unifying Concept C' in Science. Standards relevant to other disciplines (health, reading, math, social studies, etc.) will be incorporated into those standards as they are updated per the schedule outlined in the table below. It will also be important to incorporate "indicator guidelines" to show cross-curricular connections between the disciplines.

The standards themselves – including these connections – will be regarded as interim steps within a road-map across grades and disciplines to articulate way-points on the road to students' environmental literacy. Teachers will become actively responsible for making these connections.

The schedule for curriculum updates (listed below) will drive the GreenPrint's measurement timeline:

Curriculum Discipline	Revision School Year	Revision Commences
Science	2011-12 (?)	August 2010 (?)
Math	?	?
Social Studies	?	?
English/Language Arts (?)	?	?

For reporting and accountability purposes, the Nevada Report Card currently captures testing data for the state. With incorporation of new standards, data about knowledge of environmental literacy concepts will automatically be captured through examination of specific questions related to Environmental Literacy Core Concepts.

AFFECT, SKILLS, BEHAVIOR

Measuring students' Environmental Literacy as it relates to their affect (i.e. feelings), demonstrated skills, and behavior is difficult to capture through standardized testing or other commonly used assessments.

Though it is more difficult to measure community-wide success, it will be possible to examine a variety of key indicators that will serve as a proxy for an environmentally literate citizenry. Such indicators could include, but are not limited to: participation in nature-related organizations, recycle programs, and outdoor recreation visitor days. [Note: this list needs to be much stronger.]

In Formal-education classrooms, students will build a portfolio of the work they've done based on experiences they've had, including those in partnership with non-formal educational organizations. Portfolios will be evaluated using a standardized rubric to determine how well the students have developed the affect, skills, and behaviors that signify environmental literacy.

To measure learning related to the remaining three essential components – affect, skills, behavior – students will build a portfolio of the work they've done related to environmental literacy. That portfolio will be judged by teachers to determine how well the students have developed the affect, skills, and behaviors that signify environmental literacy. The expectation is that – through the High School Environmental Studies class and through their work in K-8 – students will be environmentally literate at the 'Functional' level by the time they graduate from high school.

"Measurement" Next Steps	**Responsibility**	**Date**
"Standards of Best Practices for Environmental Education and Interpretation" are agreed upon and adopted	???	
Environmental Literacy Core Concepts/Benchmarks will be included in the next revision of relevant curriculum standards • Science • Math • English/Language Arts • Social Studies	???	

Data around EL content standards is pulled separately and reported in the "Nevada Report Card" to measure students' environmental literacy	NDE	
Tools to measure portfolios are provided to teachers	NDE	
Develop longer-term key indicators		

5. A DESCRIPTION OF HOW THE STATE EDUCATION AGENCY WILL IMPLEMENT THE PLAN, INCLUDING SECURING FUNDING AND OTHER NECESSARY SUPPORT.

In order for the Nevada Environmental Literacy Plan to be effectively implemented, several conditions must be satisfied. The plan must be adopted, properly funded, communicated, implemented and assessed. The demands of these needs call for the development of an oversight council and a coordinator with the authority to actively and dynamically harmonize the components.

ADOPTION

A statewide Environmental Literacy Coordinator position should be established, along with an Environmental Literacy Council that operates on a statewide basis.

The Environmental Literacy Council should function to provide oversight, guidance, and make recommendations to the Nevada Environmental Literacy Coordinator. The Council should be responsible for filling the Coordinator position.

The Council will provide advice on educational efforts and strategic direction and informs the Coordinator on trends in education, government, business and the non-formal education sector. The Council should be comprised of a diverse representation of Nevadans from the academic, business, cultural arts, non-profit agencies, government, and community members.

The Environmental Literacy Coordinator should work closely with Council members to determine how he/she can effectively provide direction, recommendations, programs, resources, and materials that improve academic achievement and increase environmental literacy among the state's students.

The Environmental Literacy Coordinator will be responsible for raising and dispersing funds, coordinating professional development opportunities, and developing and implementing an Environmental Literacy communication plan.

FUNDING

The Environmental Literacy Coordinator will seek and secure funding from a variety of sources, such as Title II, Title V, IDEA, EPA Environmental Education program, STEM, state wildlife agencies, and pending No Child Left Inside legislation.

The Environmental Literacy Coordinator will establish a competitive grant program that will allow agencies, organizations, and individual citizens the opportunity to provide and fund environmentally focused educational programs and services.

This should include providing grant workshops for PD trainers and Non-formal providers, as well as establishing grant criteria framework to define the types of programs that should be funded, at what level, and the standards necessary to qualify for the grant. Fundable programs may include:

- Internships
- Site-based education opportunities, including field trips
- Discussion panels and other types of outreach opportunities
- Extracurricular clubs and activities
- Environmentally motivated organizations and projects

COMMUNICATION

To be adopted, a variety of agencies, organizations, and private citizens must both understand and support the GreenPrint Plan. Therefore, creating and implementing a communication plan will be an important function for the Environmental Literacy Coordinator. This communication plan should be designed for all levels of citizens, agencies, and government.

It will be important to also give periodic updates through a variety of reporting methods to the:

- State Board of Education
- Legislatures
- Government agencies such as Parks & Recreation, Wildlife, school districts, etc.

- Non-formal education providers

INTEGRATION OF THE PLAN

The Environmental Literacy Coordinator will work with Nevada Department of Education Coordinators to discuss the implementation and integration of the Environmental Literacy Core Concepts throughout all disciplines and grade levels of the Nevada Education Standards.

The Environmental Literacy Coordinator will also be tasked with providing services to:

FORMAL EDUCATION PROVIDERS

- Professional development based on the implementation and integration of the Core Concepts and Benchmarks of the Nevada Environmental Literacy Plan.
- Grant workshops to fund Environmental Literacy experiences for students, including service learning. Once formal educators have attended Environmental Literacy grant workshops they can apply for certification. This certification allows them, or the agency in which they work, the ability to apply for the Environmental Literacy competitive grants.
- Professional development in assessment of Environmental Literacy.

NON-FORMAL EDUCATION PROVIDERS

- Non-formal education agencies will become "certified" in the GreenPrint plan by participating in certification workshops provided by the Environmental Literacy Coordinator. Those entities that become certified will be able to apply for grant money. Their certification endorses them and provides them with funding for opportunities such as field trip locations/experiences/providers by the state coordinators
- Professional development for understanding the benchmarks of the Environmental Literacy Plan, including assessment.
- Grant writing workshops to fund environmental literacy experiences, including service learning, that will correlate with the graduation requirements

EVALUATION OF THE SUCCESS OF THE PLAN

a. Establishment of a grant review and evaluation process to govern extended funding on an annual basis.

b. Presentations at conferences at state, regional, and national levels to discuss the success and challenges of programs and develop new ideas for furthering environmental literacy in Nevada.

"Implementation" Next Steps	Responsibility	Date
Establish Environmental Literacy Council. Recruit from all levels of community. Develop charter and strategic plan.	GreenPrint Committee	
Establish and procure funding for Environmental Literacy Coordinator position	E.L. Council	
Create position description and hire position.	E.L. Council	
Develop implementation plan	E.L. Council with Coordinator	

APPENDIX I

CORE CONCEPTS WITH BENCHMARKS

Core Concepts (adapted with permission from the *American Zoo and Aquarium's Conservation Education Message*) are revealed through their benchmarks. The benchmarks incorporate the following essential components of environmental literacy:

- Knowledge
- Affect (Feelings)
- Skill
- Behavior/Actions

A. ALL LIFE ON EARTH EXISTS WITHIN AN ECOSYSTEM.

a. Ecosystems are made of interdependent relationships between groups of living things (biodiversity) and their physical environment.
b. An impact on any element of an ecosystem has consequences throughout that ecosystem (and potentially others).

B. HUMAN BEINGS ARE AN INTEGRAL PART OF ALL ECOSYSTEMS.

a. Human activities within ecosystems affect these systems.
b. Ecosystems can affect human decisions and activities.

C. HEALTHY ECOSYSTEMS PROVIDE MANY ESSENTIAL SERVICES AND BENEFITS THAT SUSTAIN AND IMPROVE HUMAN LIVES.

a. Natural systems maintain a habitable planet by regulating climate and by cycling water, oxygen and carbon dioxide and soil nutrients.
b. Natural systems provide human beings with essential services (ecosystem services) that sustain life on Earth: fresh air, clean water, energy, mineral resources, soil, and oceans that can produce food.
c. People depend on thousands of plants and animals to live their daily lives.
d. Biological diversity provides a multitude of natural resources used commercially for food, shelter, fiber, medicines, and other products.
e. Healthy ecosystems underpin healthy human economics. Many jobs depend directly on protecting natural ecosystems (recreation, farming, utilities).
f. Healthy communities and the people that live there are sustained by healthy ecosystems. Natural places nourish human's mental and physical health.

D. THE HUMAN EXPERIENCE REQUIRES A CONNECTION TO NATURE. THESE EXPERIENCES IN NATURAL PLACES IN OUR COMMUNITY ENRICH OUR LIVES AND INSPIRE OUR CHOICES FOR FUTURE GENERATIONS.

a. For all human beings, nature is a place to renew the human spirit and refresh our emotional and mental health.
b. The beauty and resources of the natural and cultural world are global treasures. They help define America's national heritage and character, and provide the nation with valuable and irreplaceable natural resources.
c. Nevada's natural world provides wondrous places to play and recreate, to explore, to be creative, to learn and enjoy both as individuals and with our friends and families.

E. HUMAN BEINGS ARE RESPONSIBLE FOR DRAMATIC CHANGES TO ECOSYSTEMS AT A RATE UNPRECEDENTED IN EARTH'S HISTORY

a. The growth of the human population coupled with the increased consumption of resources by individuals will increasingly impact the planet's finite resources.
b. Human threats to Nevada's environment include global climate change, invasive species, habitat destruction, water, and air quality.

F. WE HAVE THE RESPONSIBILITY TO CARE FOR THE EARTH, TO LEAVE HEALTHY ECOSYSTEMS FOR OUR FAMILIES AND FUTURE GENERATIONS

a. Human solutions to environmental challenges include sustainability initiatives that minimize our impact, such as use of alternative energy sources, public transportation, recycling, green architecture, and responsible water use.
b. Nevadan's strive for a personal commitment to help ensure environmental quality and quality of life through actions such as:
    - Making appropriate lifestyle decisions
    - Actively participating in public decisions
    - Sharing our knowledge and feelings about the natural world
    - Support local environmental organizations
    - Practice and promote stewardship and responsible use
c. Nevadan's are informed and consider multiple points of view.
d. Nevadan's have understanding of their local environment, including where their water comes from, natural features, and local environmental issues.

APPENDIX II

LEVELS OF ACHIEVEMENT OF ENVIRONMENTAL LITERACY

Measuring the Environmental Literacy of an Individual:

I. **Emergent**: At this stage of environmental literacy, a person is able to recognize many of the basic terms in the core concepts and are developing a rationale for their participation in environmental actions. They have an unsophisticated knowledge of the basic components of systems within and affecting the environment. At the emergent level, a person is developing an awareness of and sensitivity toward the environment, and has a concern for human impacts on the environment. Environmental actions that are taken are not necessarily based on knowledge and understanding of the environment.

II. **Functional**: At this level, there is a broader knowledge and understanding of the core concepts. They possess the basic ability to analyze, synthesize, and evaluate the negative and positive **interactions** among systems and predict possible outcomes. This person evaluates a selected issue on the basis of evidence *and* personal values. They have the self-efficacy to act and are motivated by the results.

III. **Operational**: At this highest level, a person has moved beyond functional environmental literacy in both the breadth and depth of understandings and skills. This person routinely evaluates the impacts and consequences of actions; gathers and synthesizes pertinent information, chooses among alternatives, and takes and advocates actions that work to sustain or enhance a health environment. They understand the cause and affect relationships between systems and thus seek solutions to possible environmental issues by taking preemptive action.